Art Unit 1206

Paper No. 16

Appeal No. 91-0763

dbd

ON BRIEF

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte Richard R. Hertzog,
Stylianos Sifniades
and
William B. Fisher

Application for Patent filed January 17, 1989, Serial No. 297,333. Decomposition Of Cumene Oxidation Product.

William H. Thrower et al. for appellants.

Primary Examiner - James H. Reamer.

Before W. Smith, Kimlin and Garris, Examiners-in-Chief.

Garris, Examiner-in-Chief.

This is a decision on the appeal from the final rejection of claims 1-8 which are all of the claims in the application.

The subject matter on appeal relates to a process for decomposing a cumene oxidation product mixture to produce phenol, acetone and alpha-methyl styrene. The process includes mixing

the cumene oxidation product in a stirred or back-mixed reactor with 10 to 100 percent acetone relative to the amount of acetone produced during the decomposition reaction. Further details of this appealed subject matter are readily apparent from a review of the appealed claims, a copy of which taken from the appellants' brief is appended to this decision.

The references relied upon by the examiner as evidence of obviousness are:

Anderson et al. (Anderson)	4,207,264	June 10, 1980
Sifniades et al. (Sifniades)	4,358,618	Nov. 9, 1982
Barilli et al. (Barilli)[1] (Great Britain)	1,202,687	Aug. 19, 1970

All of the claims on appeal stand rejected under 35 U.S.C. 103 as being unpatentable over Sifniades in combination with Barilli and Anderson. It is the examiner's position that it would have been prima facie obvious for one with ordinary skill in the art to add acetone to reactor 1 of Sifniades in the amounts and for the reasons taught by Barilli and Anderson. Further, the examiner believes that it would have been prima facie obvious to provide this acetone as a recycled distillate from a flash evaporation step in view of Barilli.

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[1] The application file record includes more than one Barilli reference. However, this record clearly reflects that the discussion in the brief and in the answer concerning Barilli are directed to the above mentioned British reference.

We refer to the brief and to the answer for a complete exposition of the respective viewpoints expressed by the appellants and the examiner concerning this rejection.

Having carefully reviewed the record before us, it is our determination that we should sustain the above noted rejection. Our reasons follow.

With regard to the examiner's rejection, the appellants point out that "Sifniades...teaches the use of a three stage operation but without acetone recycle [whereas] Barilli...and Anderson teach the use of acetone as a solvent, but in a single stage reaction" (brief, page 3; emphasis in original). This discussion of the respective deficiencies of the applied references taken individually serves little purpose in resolving the issue of obviousness raised by the examiner's rejection. This is because applicants cannot show nonobviousness by attacking references individually where, as here, the rejection is based upon a combination of references. In re Young, 403 F.2d 754, 159 USPQ 725, 728 (CCPA 1968). In the context of such a rejection, the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. In re Keller, 642 F.2d 413, 208 USPQ 871, 881 (CCPA 1981).

In the case at bar, Sifniades discloses all aspects of the claim 1 process except for the acetone limitation. However,

the secondary reference to Barilli explicitly teaches that the addition of acetone in the amounts under consideration to a reaction of the type conducted in reactor 1 of Sifniades results in an improved yield of reaction products with a concomitant decrease of undesired byproducts (e.g., cumylphenol; see Examples 1 through 4 of Barilli). Because Sifniades desires an improved product yield and a reduction in undesired byproducts (e.g., cumylphenol; see lines 27 through 29 in column 1 and lines 19 through 24 in column 2), it would have been prima facie obvious to add acetone to reactor 1 of Sifniades in the amounts and for the reasons taught by Barilli. The process resulting from this modification would fully correspond to the process defined by independent claim 1.

Concerning dependent claims 3 and 5, the appellants argue that "[t]he examiner has failed to address the combination including the step (c) expressed in claims 3 and 5" and that "[t]his is not taught or suggested by the cited references" (brief, page 7). We cannot agree. Barilli explicitly discloses obtaining his added acetone as a recycle stream from a product separation step; see lines 36 through 40 on page 2. In light of this disclosure, we share the examiner's conclusion of prima facie obviousness notwithstanding the appellants' very general assertions to the contrary.

As rebuttal evidence of nonobviousness vis-à-vis unexpected results, the appellants refer to the data in their specification and drawing (i.e., Table I of the specification and Figure 2 of the drawing). We consider this data to have little, if any, probative value as evidence of unexpected results for a number of reasons.

First, while it appears that the data in question is intended to reflect the differences between a process of the type taught by Sifniades with versus without the addition of acetone, the differences established by the data are not described in the specification with sufficient detail to determine whether they are statistically significant, unexpected and of practical significance. In re Merck & Co. Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Freeman, 474 F.2d 1318, 177 USPQ 139 (CCPA 1973); In re Klosak, 455 F.2d 1077, 173 USPQ 14 (CCPA 1972); In re D'Ancicco, 439 F.2d 1244, 169 USPQ 303 (CCPA 1971). Secondly, it appears to us that any improved product yield reflected by this data would have been expected rather than unexpected. That is, since the multistage process of Sifniades and the acetone addition of Barilli are disclosed as individually resulting in improved yields, the combination of Sifniades' multistage process with Barilli's acetone addition would have

been expected to result in an even greater yield improvement. Thirdly, even if the appellants' data were assumed to evince unexpected results, this evidence is plainly not commensurate in scope with the claims to which it pertains (cf., the 40 percent and 60 percent acetone concentrations of this data and the 10 percent to 100 per cent acetone concentrations of the appealed claims) and therefore is inadequate to rebut the examiner's prima facie case of obviousness. See In re Dill, 604 F.2d 1356, 202 USPQ 805 (CCPA 1979).

Under these circumstances, we are convinced that the evidence of record, on balance, favors a conclusion of obviousness. It follows that we will sustain the §103 rejection before us.

The decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR 1.136(a). See the final rule notice, 54 F.R. 29548 (July 13, 1989), 1105 O.G. 5 (August 1, 1989).

AFFIRMED

William F. Smith
Examiner-in-Chief

Edward C. Kimlin
Examiner-in-Chief

Bradley R. Garris
Examiner-in-Chief

BOARD OF PATENT APPEALS AND INTERFERENCES

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APPENDIX

1. A process for decomposing a cumene oxidation product mixture containing cumene hydroperoxide (CHP) and dimethylphenyl carbinol (DMPC) to produce phenol, acetone and alpha-methyl styrene (AMS) with enhanced safety of operation and reduced by-product formation which comprises the steps:

(a) mixing the cumene oxidation product in a stirred or back-mixed reactor with an acid catalyst, with 10 to 100 percent acetone relative to the amount of acetone produced during the decomposition reaction, and with up to 4 weight percent additional amounts of water relative to the reaction mixture, at an average temperature between about 50°C and about 90°C for a time sufficient to lower the average CHP concentration of the reactor to between about 0.2 and about 3.0 weight percent, and wherein a portion of DMPC is converted to dicumyl peroxide (DCP); then

(b) reacting the reaction mixture from step (a) at a temperature between about 120°C and 150°C under plug-flow conditions for a time sufficient to decompose substantially all residual CHP and at least 90 percent of the DCP formed in step (a).

2. The process of claim 1 wherein step (a) additionally comprises reacting the reaction mixture having an average CHP concentration of between about 0.2 and about 3.0 weight percent at between 50°C and about 90°C under plug-flow conditions for a time sufficient to produce a reaction mixture having a CHP concentration no greater than about 0.4 weight percent.

3. The process of claim 2 further comprising the step:

(c) submitting the reaction product from step (b) to adiabatic flash evaporation to recover an acetone-rich distillate and recycling said distillate to step (a) to provide said acetone.

APPENDIX

4. The process of claim 3 wherein the CHP concentration is monitored by on-line analysis.

5. The process of claim 1 further comprising the step:

(c) submitting the reaction product from step (b) to adiabatic flash evaporation to recover an acetone-rich distillate and recycling said distillate to step (a) to provide said acetone.

6. The process of claim 5 wherein the CHP concentration is monitored by on-line analysis.

7. The process of claim 1 wherein the CHP concentration is monitored by on-line analysis.

8. The process of claim 2 wherein the CHP concentration is monitored by on-line analysis.